

Application No. 09/601,955
Attorney Docket 032802-007

(ii) inspecting said parts for defects, and
reducing injection stroke in response to any flashing or
increasing injection stroke in response to any short shots; and
(iii) inspecting said parts for defects, and reducing injection velocity in
response to any flashing or increasing injection velocity in
response to any short shots;
wherein either step (iii) is employed after step (ii) if step (ii) is found to
have substantially no effect or substantially no further effect, or step
(ii) is employed after step (iii) if step (iii) is found to have substantially
no effect or substantially no further effect, thereby reducing said
defects;

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(2) determining an optimum injection velocity profile, including:

(i) manufacturing one of more parts with said machine;
(ii) determining an injection pressure profile by measuring injection
pressure as a function of elapsed injection time with said machine
configured with a substantially constant, desired injection velocity;
(iii) measuring injection velocity as a function of elapsed injection time
and determining a profile of said measured injection velocity;
(iv) defining a mean pressure profile from said pressure profile in a
regime of substantially constant measured injection velocity profile;
(v) adjusting said velocity profile over at least a portion of an injection
velocity phase in response to said pressure profile to reduce differences
between said pressure profile and said mean pressure profile, thereby
tending to lessen irregularities in said pressure profile;

(3) modifying a post-velocity control phase intermediate set-up obtained after
steps (1) and (2) in response to quality defects detected in said parts manufactured
with said intermediate set-up to reduce said defects;

(4) a method of reducing kickback to an acceptable level to determine a critical
packing/holding pressure, including:

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- (i) setting an initial packing/holding pressure to a default low pressure;
 - (ii) performing at least a partial injection cycle;
 - (iii) determining kickback from changes in screw displacement during said at least partial injection cycle;
 - (iv) incrementing said initial packing/holding pressure; and
 - (v) repeating steps (iii) and (iv) if kickback is unacceptably high until kickback is reduced to a predetermined acceptable level, or initial packing/holding pressure reaches maximum machine pressure;

(5) deducing material solidification time from measurements of screw displacement to determine an optimal packing/holding pressure profile, including:

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- (i) defining a holding time equal to a predetermined default value;
 - (ii) performing at least a partial injection cycle;
 - (iii) measuring a pressure stroke being the change in displacement of said screw between packing time and said holding time;
 - (iv) incrementing said holding time;
 - (v) repeating steps (iii) and (iv) until said pressure stroke stabilizes or a part so produced is acceptable;
 - (vi) defining a linear relationship between screw displacement and time consistent with screw displacement at said packing time and at said holding time, between said packing time and said holding time;
 - (vii) defining a gate freeze time as a time of maximum difference between said screw displacement and said linear relationship, thereby providing a value for said gate freeze time from measurements of said screw displacement;

(6) modifying a post-pressure control phase preliminary set-up obtained after (1) to (5) in response to defects detected in said parts manufactured with said preliminary set-up to reduce said defects.